

SEROLIS (CRUSTACEA, ISOPODA, SEROLIDAE) FROM AUSTRALIA,
WITH A NEW SPECIES FROM VICTORIA

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Abstract

Species of *Serolis* from eastern Australia (except *S. minuta* and related species) are described and figured and a key to distinguish them is presented. These are *Serolis australiensis*, *S. elongata*, *S. levidor-sata* sp. nov., *S. longicaudata*, *S. pallida* and *S. tuberculata*.

Introduction

Isopods of the genus *Serolis* Leach, 1818, are common components of the fauna of particulate substrates off the coast of eastern and southern Australia. Eight species have previously been described: *S. tuberculata* Grube, 1875; *S. australiensis* Beddard, 1884; *S. elongata* Beddard, 1884; *S. longicaudata* Beddard, 1884; *S. pallida* Beddard, 1884; *S. minuta* Beddard, 1884; *S. bakeri* Chilton, 1917; and *S. yongei* Hale, 1933.

Little work has been carried out on Australian species and Sheppard's world-wide monograph (1933) and Beddard's (1884b) work remain the standard texts for the identification of these species. Recently, Holdich and Harrison (1980) examined specimens belonging to the *Serolis minuta*-group (a term coined by Monod (1971) to include *S. minuta*, *S. bakeri* and *S. yongei*) and found a marked capability for intraspecific morphological variation. As an extension of this work, specimens of all other Australian species are examined here and an additional species is described.

The material on which this study is based comes from shelf and bay sediments, largely from south-eastern Australia. All specimens have been identified except for numerous poorly preserved juveniles from Western Port (in Museum of Victoria collections) and two problematical series of specimens. These are discussed under *S. australiensis* and *S. pallida* in turn.

Material for this study has come from the following surveys and institutions:

Port Phillip Bay Environmental Study,

1969-1973 (PPBES) carried out in Port Phillip Bay, Victoria, by the Marine Studies Group, Ministry for Conservation, Melbourne, Victoria;

Crib Point Benthic Survey, 1965-1972 (CPBS) and Westernport Bay Environmental Study, 1973-1974 (WBES), both carried out in Western Port, Victoria, by the Marine Studies Group, Ministry for Conservation, Melbourne.

Bass Strait Survey, 1979-1983 (BSS), carried out by the Museum of Victoria with funding from a Marine Sciences and Technologies Grant;

Shelf Benthic Survey, 1973 (AMSBS) carried out on the New South Wales shelf by the Australian Museum, Sydney, N.S.W.;

Three Bays Survey, 1976, carried out near Townsville, Queensland, by James Cook University, Townsville;

'Endeavour' collections, 1914, made on the New South Wales shelf; and other material from the Museum of Victoria, Melbourne (formerly National Museum of Victoria) (NMV); Australian Museum, Sydney (AM); Universitetets Zoologiske Museum, Copenhagen (ZMC); Tasmanian Museum, Hobart (TM); British Museum (Natural History), London (BMNH); and South Australian Museum, Adelaide (SAM).

Specimens not ascribed to a museum have been placed in a collection in the Department of Zoology, University of Nottingham.

The following developmental stages have been recognized: adult male (male with pereopod 2 prehensile, subchelate); subadult

male (stage before adult male, with appendix masculina shorter, and pereopod 2 not prehensile); immature male (stage before subadult male, with appendix masculina visible only as a short extension of the endopod of pleopod 2); ovigerous female (female with brood plates fully formed and overlapping well in the midline); non-ovigerous female (stage before ovigerous female, with small brood plates closely applied to ventral surface and not reaching midline); immature specimen (specimen with all pereopods fully formed, but showing no obvious sexual characters); and post-manca (with seventh pair of pereopods reduced, held horizontally across ventral surface of body).

The scale on all figures is 1 mm.

SYSTEMATICS

Order Isopoda

Infra-order Flabellifera

Family SEROLIDAE

Description: Flabellifera with body markedly dorsoventrally flattened; coxal plates laterally expanded. Pereonite 1 fused with head in midline and enclosing head laterally. Pereonite 7 absent dorsally, or present only as short lateral plates. Pleon with three visible tergites; at least the first narrow, not reaching the lateral margins of the body. Antenna 1 peduncle of four articles. Antenna 2 peduncle of five articles. Each mandible with three-articled palp. Mandibles lacking molar processes; incisor processes well formed, each with two internal subterminal movable spines. Maxilla 1 with inner lobe reduced, outer lobe bearing long stout spines. Maxilla 2 usually with three (occasionally two) spiniferous lobes. Maxilliped broad with a short three-articled palp. Pereopod 1 of both sexes subchelate with dilated ovate propodus bearing inferior rows of setae. Pereopods 3 to 7 ambulatory. Pleonal sternites 1 to 3 each with a small subrectangular plate in midline. Pleopods 1 to 3 each with an elongate basis and sub-elliptical rami; rami bearing long marginal plumose setae. Exopod of pleopod 4 indurate, operculate, covering endopod and pleopod 5 which are respiratory. Uropods

usually biramous (occasionally uniramous). Sexual dimorphism not pronounced.

Adult male. Pereopod 2 subchelate, smaller than pereopod 1. Pereopod 7 may bear a reflexed dactylus. Penes absent. Endopod of pleopod 2 bearing a long narrow appendix masculina.

Ovigerous female. Maxillipedal endite may be expanded; other mouthparts not metamorphosed. Pereopod 2 ambulatory. Brood pouch formed from four pairs of brood plates, arising from pereopods 1 to 4 and overlapping well in the midline.

Remarks: The family Serolidae contains four genera: *Serolis* Leach, 1818; *Glabroserolis* Menzies, 1962; *Ceratoserolis* Cals, 1977; and *Atlantoserolis* Cals, 1982.

Glabroserolis was erected to contain Menzies' new species *G. specialis* from the South Atlantic, and was defined as "Serolidae with uniramous uropoda. Coxal plates not marked off on any peraeonal somite. First antenna one-half the width of expanded peduncular article of second. Second article of maxillipedal palp quadrate, not cordate. Basipodites of pleopods 1 to 3 with projecting setiferous inner proximal angles."

Uniramous uropoda are also shown by some species of *Serolis* (e.g., *S. beddardi* Calman; *S. latifrons* Miers); expanded antennal peduncles are shown by *S. pallida*; maxillipedal palp article 2 varies in shape within the genus *Serolis*, many Australian species having this article curved, not cordate; and most non-Australian species have the bases of pleopods 1 to 3 with setiferous extensions. Menzies did not mention pleonal tergites 2 and 3 which are reduced in *G. specialis* and do not reach the lateral margins of the body. This reduction, however, is present to some extent in *Serolis orbiculata* Sheppard.

The only character shown by *Glabroserolis* not shown by typical species of *Serolis* is the lack of sutures separating the coxal plates from the thoracic tergites, but as the number of these sutures varies in the genus *Serolis*, it is not felt here that this character is sufficient to warrant full generic status. The authors feel that *Glabroserolis* should be considered a junior synonym of *Serolis*.

Ceratoserolis was very briefly diagnosed

(Cals, 1977: 2273-6) and was erected to include the Antarctic species: *Serolis trilobitoides* (Eights); *S. cornuta* Studer; and *S. pasternaki* Kussakin. Cals did not contrast *Ceratoserolis* with *Serolis* sensu stricto and the present authors can offer no opinion on the status of this genus. Similarly, *Atlantoserolis* for *S. vemae* Menzies and *S. menziesi* Hessler differs from other serolids in only minor characters.

All Australian serolids are species of *Serolis* and can be separated from all other Australian isopods by use of the family description.

(But see note added in proof.)

Serolis Leach, 1818

Serolis Leach, 1818: 339, 340.

Brongniartia Eights, 1833, 53

Glabroserolis Menzies, 1962: 189

All Australian species of *Serolis* have pereonite 7 absent dorsally, the tergite of pereonite 6 fused with pleonite 1 in the midline, and the bases of pleopods 1 to 3 simple, lacking the proximal acute setiferous extension shown by most non-Australian species. Monod (1971) separated three species (*S. minuta*, *S. bakeri* and *S. yongei*) from the rest of the species of the Australian fauna. Holdich and Harrison (1980) discussed variation in this "*minuta*-group" and they are not discussed further in this contribution. Characters separating the "*minuta*-group" from other Australian species are given in Table 1.

Key to Australian Species of *Serolis*

1. Pleonal sternites 1-3 not markedly keeled *S. minuta*—group (see Holdich and Harrison, 1980)
- Pleonal sternites 1-3 markedly keeled (e.g., fig. 1g, h) 2
2. Pereon and pleon dorsally smooth, lacking obvious tuberculation (except perhaps in midline) 3
- Pereon and pleon bearing obvious dorsal tuberculation (in addition to the midline) ... 6
3. Midline with pronounced slender dorsal tubercles; antenna 2 peduncle markedly flattened, expanded, greater than twice width of antenna 1 peduncle; uropodal exopod apically emarginate *S. pallida*
- Midline at most slightly carinate; antenna 2 peduncle less than twice width of antenna 1 peduncle; uropodal exopod apically truncate or arcuate 4
4. Pleotelson subtriangular, tapering from anterolateral angles; uropods originating in anterior half *S. levidorsata*
- Pleotelson tapering from midpoint of lateral margins; uropods originating in posterior half 5
5. Head with median tubercle; pereon and pleon medially carinate; uropods not reaching pleotelsonic apex *Serolis* sp.
- Head lacking tubercles; pereon and pleon either lacking any indication of median keel, or with weak median keel; uropods reaching pleotelsonic apex *S. longicaudata*
6. Dorsal surface bearing short fine setae (at least some on pleotelson and coxal plates); uropodal exopod apically emarginate *S. tuberculata*
- Dorsal surface lacking setae; uropodal exopod apically truncate 7
7. Dorsal midline with pronounced slender tubercles; pleotelson with well-produced dorsolateral spines *S. elongata*
- Dorsal midline with low weakly produced tubercles; pleotelson with no obvious dorsolateral spines *S. australiensis*

***Serolis australiensis* Beddard**

Figures 1, 2

Serolis australiensis Beddard, 1884a: 330, 334, 335.—1884b: 10, 15, 31, 66, 68-72, 81, pl. 6.—Chilton, 1917: 393, 394, 396, 397.—Hale, 1929: 307-9.—Nordenstam, 1933: 16, 17, 45, 47.—Sheppard, 1933: 256, 265, 268-71, 281, 353, 356-8.—Monod, 1971: 332.—Holdich & Harrison, 1980: 373, 384.

S. australiensis (sic.).—Nordenstam, 1933: 39.

Serolis (Heteroserolis) australiensis.—Nordenstam, 1933: 90-2.

Material examined: 58 specimens (4 ovigerous females in Mar. and Apr.) as follows:

SA, No locality, SAM C388(1).

Vic., Port Phillip Bay, off Kororoit Creek, 4.5 m, NMV (1). Hobsons Bay, NMV J1502(1). Western Port: 9 m, sand, WBES stn 1722, NMV J1422(1), NMV J1423(1); 2-19 m, mud,

TABLE 1
A comparison of the two groups of Australian serolids.

<i>minuta</i> -group	other species
1. Pleonal sternites 1 to 3 not markedly keeled; sternite 1 lacking median posterior projection	— Pleonal sternites 1 to 3 markedly keeled; sternite 1, especially, with keel extending posteriorly to overlap sternite 2
2. Pereonite 5, in dorsal midline, usually longer than half length of pereonite 4	— Pereonite 5, in dorsal midline, less than one-third length of pereonite 4, or absent
3. Left mandible with distal, subterminal spine as a broad serrate blade, at least two-thirds width of incisor edge	— Left mandible with distal, subterminal spine not forming a broad blade, less than one third width of incisor edge
4. Carpus of pereopod 1 with an obvious tuft of setae in addition to the two spines	— Carpus of pereopod 1 lacking tuft of setae, at most with several short obscure setae and two spines
5. Propodus of pereopod 1 with a lateral row of long spines in addition to two rows of flattened setae along cutting edge	— Propodus of pereopod 1 lacking lateral row of long spines; with two rows of flattened setae along cutting edge only
6. Coxal plates of pereonite 5 may be partially or completely separated from tergite by sutures	— Coxal plates of pereonite 5 never separated from tergite by sutures
7. Head bearing 1, 3 or 5 posterior tubercles	— Head without tubercles or, at most, one posterior tubercle
8. Article 2 of maxillipedal palp with lateral margin slightly concave proximally; article broadening distally	— Article 2 of maxillipedal palp with lateral margin markedly concave, subparallel to setiferous mesial margin
9. Proximal articles of pereopod 2 of adult male lacking spines; merus and carpus bearing long inferior plumose setae	— Proximal articles of pereopod 2 of adult male bearing spines, lacking plumose setae

sand and shell sediments: 34 specimens from 21 CPBS stations, NMV J1401-21;

Bass Strait, eastern and western Bass Strait, 6-124 m, sandy and shelly sediments, 14 specimens from 9 BSS stations, NMV J1503-6, J2986-90. Off East Monocoeur Is., "Challenger" stn 162, BMNH (3 types).

Tas., Frederick Henry Bay, J. R. Penprase, 16 Aug. 1971, TM G1351(1). Spring Beach (nr Orford), 20 m, A.J. Dartnall, 9 Jun. 1977, TM(1).

Description: Body outline broad, ovate; coxal plates of pereonites 2 to 6 curved, apices acute, closely applied, not freely projecting. Coxal plates of pereonites 2 to 4 separated from tergites by sutures. Head with one low, posterior tubercle. Pereonites 1 to 4 each bearing a long low median tubercle. Dorsal surface of entire body bearing small tubercles weakly developed in some specimens. In the dorsal midline, the posterior margin of pereonite 5 may be fused completely with pleonite 1; marked posteriorly only by a shallow groove; or may be completely distinct from pleonite 1. Pleonal tergites each with a long low median tubercle; pleonites 2 and 3 wider than pleotelson, margins rounded. Pleotelson broader than

long, with a median longitudinal carina and, either side of midline, a tuberculate transverse ridge terminating laterally as a low obscure tubercle. Pleonal sternites with pronounced extensions, that of pleonite 1 extending just beyond apex of that of pleonite 2 and not bearing a longitudinal groove.

Antenna 1 extending to pereonite 4. Antenna 2 slender, peduncle not flattened, extending to pereonite 3. Uropodal endopod extending to level of pleotelsonic tip, apex acute; exopod two-thirds length of endopod, apex broadly truncate.

Adult male. Propodus of pereopod 2 broad proximally and tapering distally with the posterior margin bearing two rows of spines along most of its length (Table 2).

Distribution: SA, Vic., eastern Tas., Bass Strait; shelf and bays (type-locality: Bass Strait).

Remarks: The size and distribution of dorsal tubercles varies greatly within this species (Fig. 2). Less tuberculate forms are similar to *S. elongata* but in *S. australiensis* the large median tergal and lateral pleotelsonic tubercles are less pronounced, and the overall body shape is less elongate.

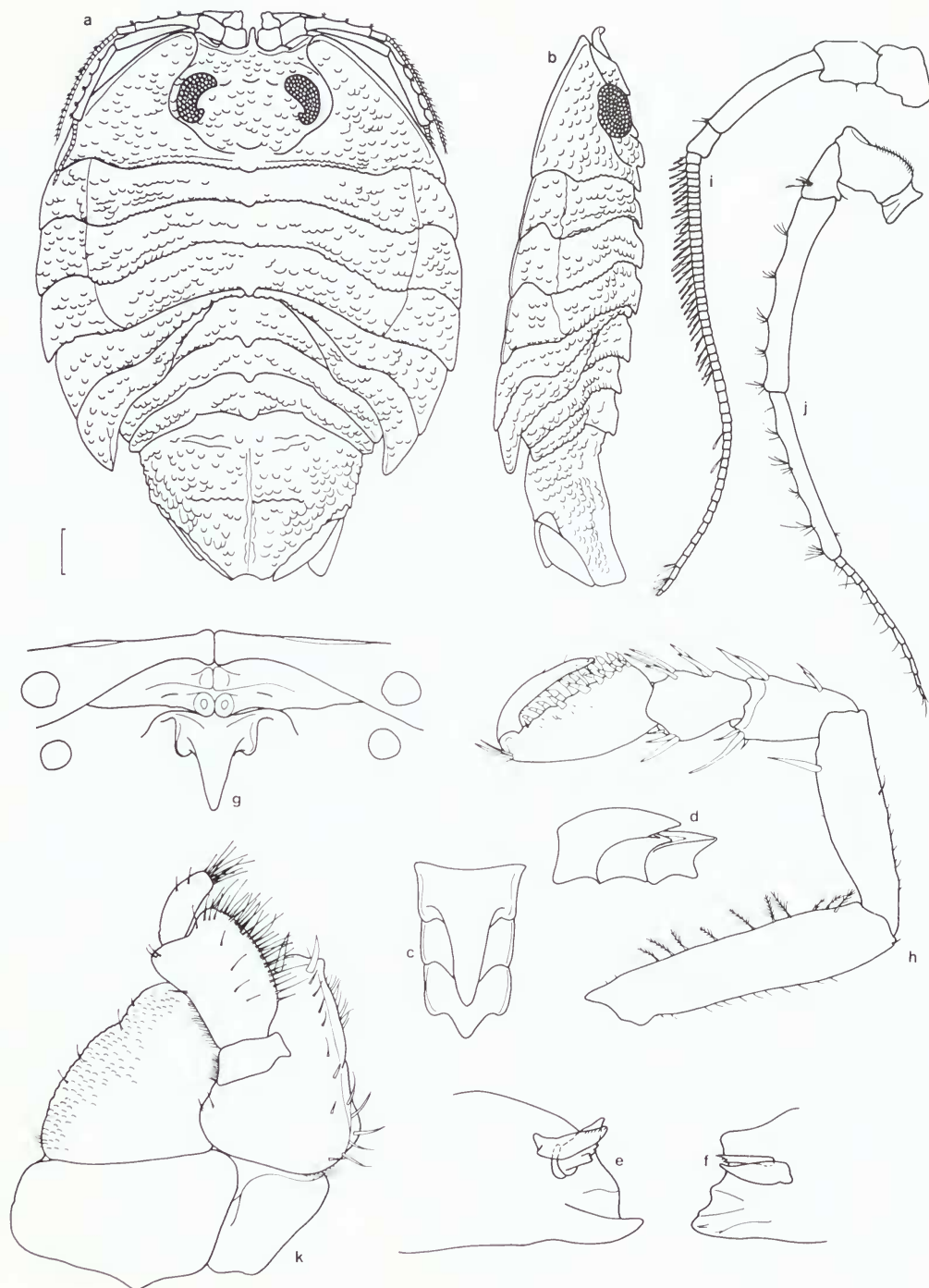


Figure 1. *Serolis australiensis*, Western Port. Ovigerous female (NMV J1408): a, b, dorsal and lateral views; c, d, pleonal sternites; e, f, left and right mandibles. Adult male (NMV J1406): g, posterior pereonal sternites; h, pereopod 2. Adult male (NMV J1407): i, j, antennae 1, 2; k, maxilliped.

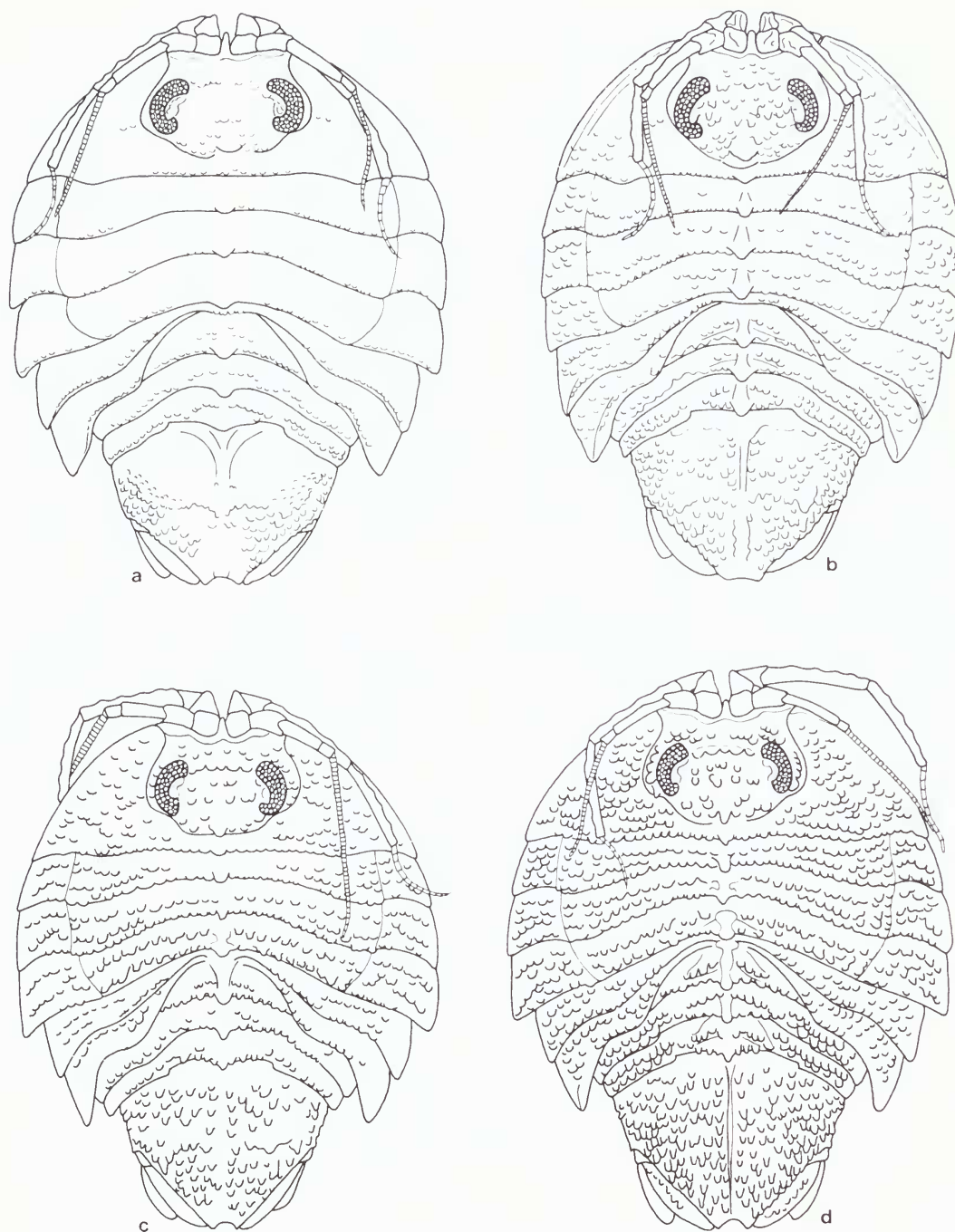


Figure 2. *Serolis australiensis*. a, non-ovigerous female, Port Phillip Bay (NMV J1502). b, ovigerous female, Western Port (NMV J1407). c, subadult male, Western Port (NMV J1401). d, non-ovigerous female, Western Port (NMV J1423).

TABLE 2

Number of spines on propodus of pereopod 2 of adult males of Australian species of *Serolis*. n is number of individuals examined.

	n	Left pereopod		Right pereopod	
		Anterior row	Posterior row	Anterior row	Posterior row
<i>S. australiensis</i>	7	6-9	4-6	8-10	4-6
<i>S. elongata</i>	9	4-8	3-5	4-8	3-5
<i>S. levidorsata</i>	1	6	8	5	6
<i>S. longicaudata</i>	1	5	3	5	4
<i>S. pallida</i>	2	5	6	5	6
<i>S. tuberculata</i>	9	5-8	4-5	6-8	4-6
<i>S. minuta</i> -group	23	2-5	2-6	2-6	2-6

Four specimens from the Australian Museum collections off Sydney and Newcastle key to *S. australiensis*. One of these is the male referred to by Whitelegge (1901) as *S. tuberculata*. These are outside the distributional range of the remaining material and differ in a few minor characters—more elongate first pleonal sternite, more elongate sixth coxal plate and longer antenna 1 flagellum. Their identity remains undecided.

Whitelegge (1901) recorded a single female of *S. australiensis* from off Botany Bay ("Thetis" stn 36) but no specimen from this locality exists in the Australian Museum. However, two specimens labelled Cape Three Points (stn 9) are registered (AM G2199 and P32612). The first of these, a female, is one of the four specimens mentioned above, the second a male, belongs to *S. elongata*. It seems possible that this additional "Thetis" material was not examined by Whitelegge.

Serolis elongata Beddard

Figure 3

Serolis elongata Beddard, 1884a: 330, 335.—1884b: 31, 66, 71, 72, 81.—Whitelegge, 1901: 204, 237.—Chilton, 1917: 393, 394.—Sheppard, 1933: 330-332.—Holdich & Harrison, 1980: 373, 380, 383, 384.

Serolis yongei.—Monod, 1971: 327-31, figs. 4-8. (not Hale, 1933).

Material examined: 104 specimens (ovigerous females in Feb., Apr., Sep. and Oct.):

Vic., Western Port, 5-14 m, mud, sand and shell sediments: 6 specimens from 4 CPBS stations, NMV J1517-20.

Bass Strait, off Cape Everard (Point Hicks), 164-273 m, SAM E6160(1). Flinders Canyon, N. of Flinders Island, 73-329 m, sandy sediments: 4 specimens from 3 BSS stations, NMV J1521-3. Eastern Bass Strait, 58-140 m, sandy sediments: 20 specimens from 5 BSS stations NMV J2981-5.

NSW, off Twofold Bay (37°05'S, 150°05'E) "Endeavour" collection, 30 Sep. 1914: 55-91 m, ZMC (13 specimens); 70-100 m, ZMC(6). Ulladulla, 75 m, K. Sheard, 7 Jun. 1944, SAM TC3624(1). Disaster Bay, "Endeavour" collection, 1 Oct. 1914, 55-73 m, sand and mud, ZMC(1). Port Jackson, 55 m, "Challenger" collection: BMNH 1889.4.27.33 (holotype). Off Port Jackson Heads, "Challenger" collection: NMV J1516(4). Off Cape Three Points, "Thetis" collections, 25 Feb. 1898: 40 m, AM P32612(1); 75-91 m, AM G2284(1). E. of Malabar, 32-83 m: 40 specimens from 5 AMSBS stations, AM P22756-66, P22768-71.

Qld, off Brisbane, fine gravel, 136 m, "Nimbus" collection, 28 Jul. 1968: AM P20194(2), AM P20195(3).

Description: Body outline elongate, ovate. Coxal plates of pereonites 2 to 6 short, apices acute, closely applied. Coxal plates of pereonites 2 to 4 separated from tergites by sutures. Head with one prominent posterior tubercle. Pereonite 1 with short median tubercle, pereonites 2 to 4 each bearing a pronounced acute median tubercle and weak transverse tuberculation. In the dorsal midline pereonite 5 may be: fused completely with pleonite 1; marked posteriorly only by a shallow groove; or may be completely distinct from pleonite 1. Pleonal tergites each with a prominent acute

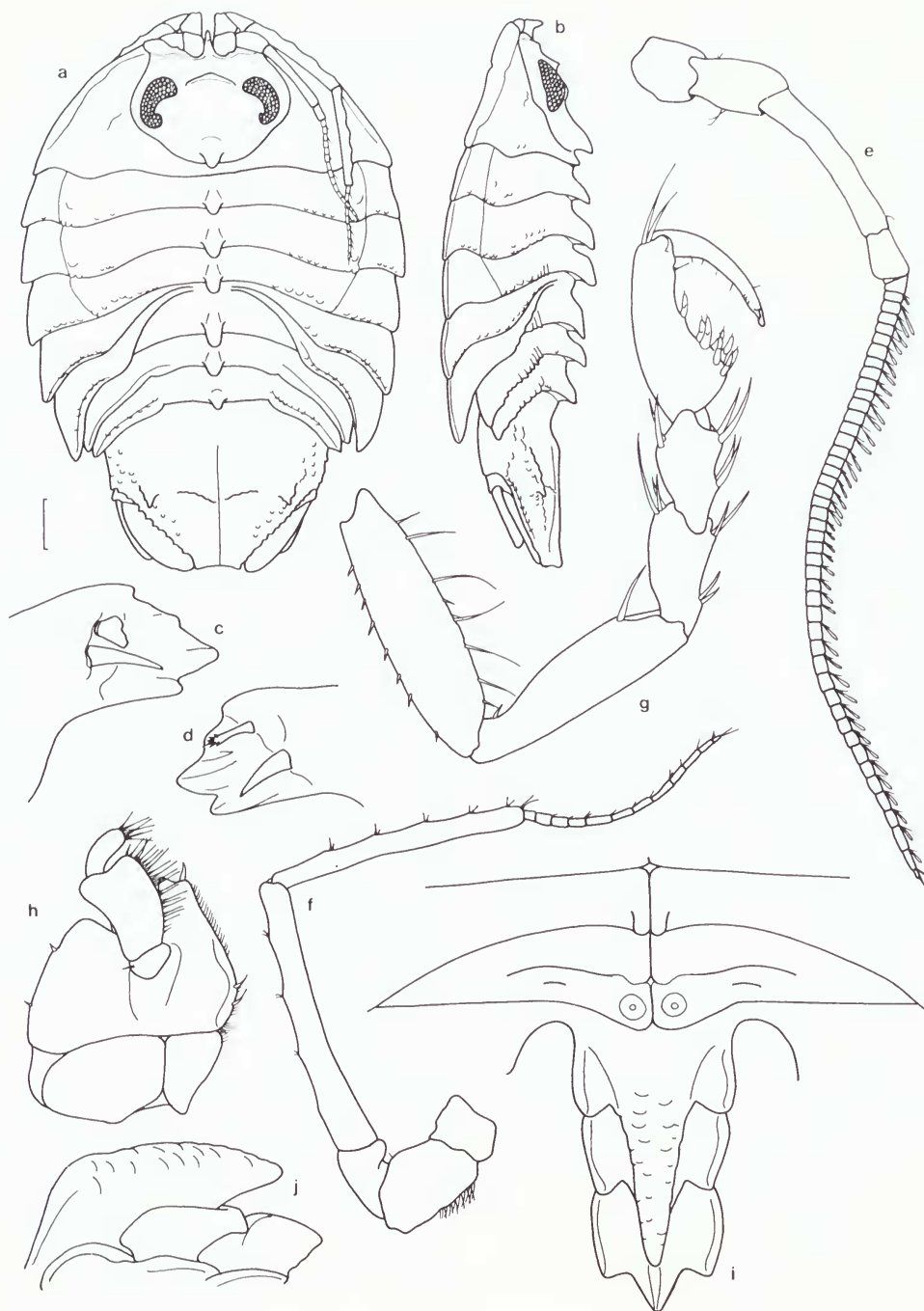


Figure 3. *Serolis elongata*, off Port Jackson. Ovigerous female (NMV J1516): a, b, dorsal and lateral views; c, d, left and right mandibles. Adult male (NMV J1516): e, f, antennae 1, 2; g, pereopod 2; h, maxilliped; i, posterior pereonal and pleonal sternites; j, pleonal sternites.

median tubercle; lateral margins of pleonites 2 and 3 not extended. Pleotelson broader than long with a low median carina and, either side of midline, an obscure median transverse ridge terminating laterally as a prominent acute tubercle. Pleotelson with lateral acute submarginal tubercles. Pleonal sternites with pronounced extensions, that of pleonite 1 extending beyond apex of that of pleonite 2 and not bearing a longitudinal groove.

Antenna 1 extending to pereonite 3. Antenna 2 slender, peduncle not flattened, extending to pereonite 4. Uropodal endopod extending to level of pleotelsonic tip, apex broadly rounded; exopod two-thirds length of endopod, apex broadly truncate.

Adult male. Propodus of pereopod 2 is proximally dilated and distally slender, the proximal bulge bearing two rows of spines (Table 2).

Distribution: Eastern Vic., Bass Strait, NSW and southern Qld (type-locality: Port Jackson, NSW).

Remarks: Slight variation in dorsal tuberculation occurs in this species, with some specimens having irregular transverse ridges on the thoracic tergites while others bear rows of small tubercles. Whitelegge's specimen (Whitelegge, 1901: 237; Holdich and Harrison, 1980: 383, 384) is an ovigerous female of this species (not male as previously reported) and bears extensive, fine tuberculation.

Monod (1971) recorded two specimens from off Moreton Island as *Serolis yongei* Hale. By applying the criteria of Table 1 it was discovered that these specimens do not belong in the *Serolis-minuta*-group and are probably immature specimens of *Serolis elongata* (with which they were found).

***Serolis levidorsata* sp. nov.**

Figures 4, 5

Material examined: Holotype, adult male, 8.7 mm, NMV J1483. Vic., Crib Point, Western Port (38°20.83'S, 145°13.49'E), 13 m, sandy gravel, 25 Aug. 1966 (CPBS station 32N).

Paratypes: Vic., Port Phillip Heads, J.H. Gatliff, Dec. 1901, NMV J1493 (1 ovigerous

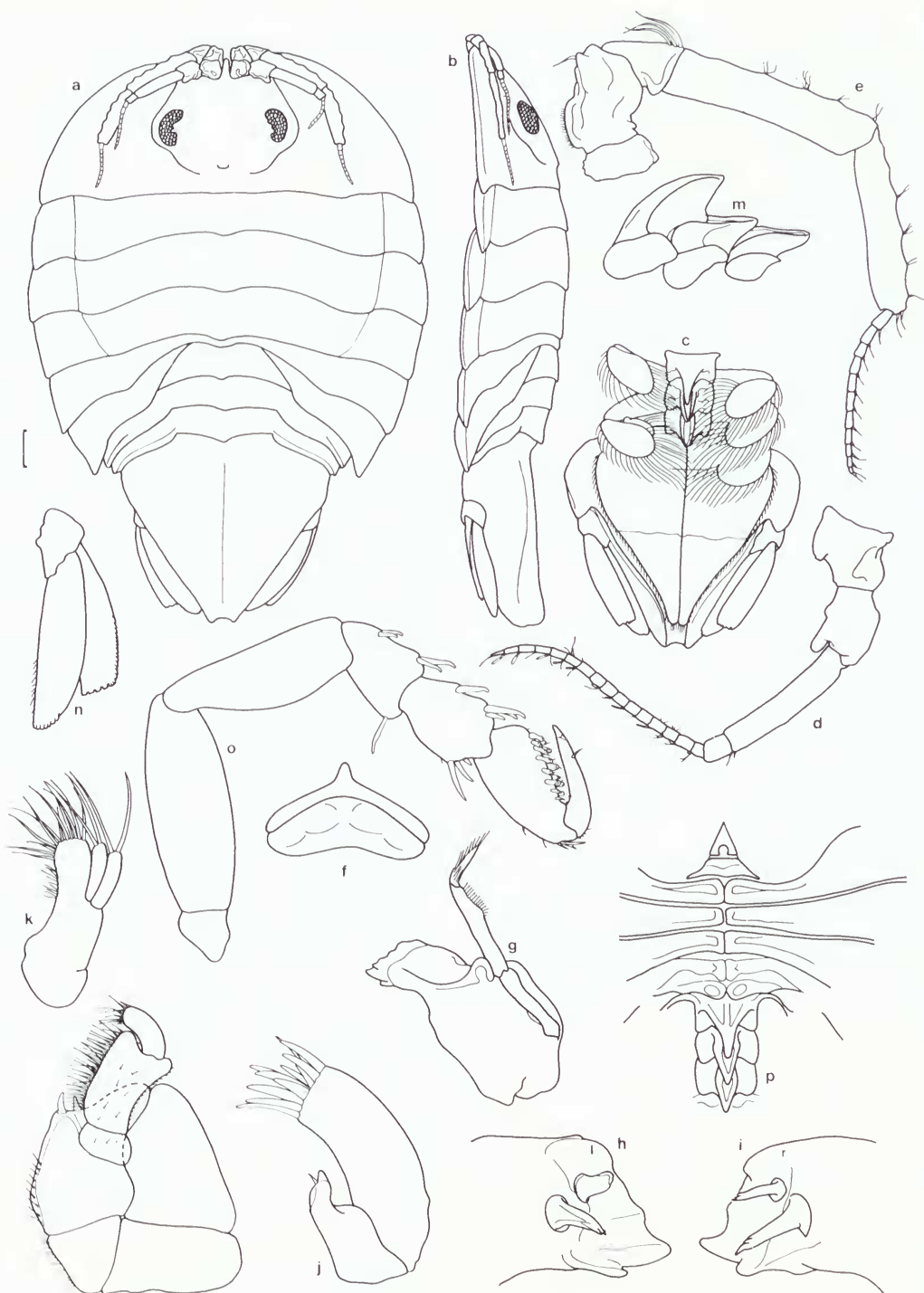
female, allotype, 15.4 mm). Western Port, C. J. Gabriel, NMV J1484 (1 ovigerous female). Crib Point, 14 m, Aug. 1970 (CPBS stn 32S), NMV J1494 (1 ovigerous female). Crib Point, 13 m, Mar. 1965 (CPBS stn 32N), NMV J1495 (2 post-mancae).

Description: Adult male. Body outline elongate, ovate; coxal plates of pereonites 1 to 6 closely applied with little or no free projection. Coxal plates of pereonites 2 to 4 separated from tergites by sutures. Head lacking an obvious tubercle. Dorsal surface of body lacking tuberculation but having a weak median keel. In the dorsal midline pereonite 5 is distinct from pleonite 1. Lateral margins of pleonites 2 and 3 not extended. Pleotelson subtriangular, just broader than long, with a deep ventral groove at the apex. Pleonal sternites with pronounced extensions, that of pleonite 1 strongly ventrally lobed, extending half way to apex of second pleonal sternite and not bearing a longitudinal groove. (Mouthparts of male not dissected).

Antennae slender, peduncular articles 1 and 2 sculptured. Antenna 1 with 26-articled flagellum just longer than peduncle, extending to posterior margin of pereonite 2. Antenna 2 peduncle with anterior margins of articles 4 and 5 weakly crenulate; 11-articled flagellum subequal in length to peduncle article 5 and extending to middle of pereonite 2. Pereopod 2 propodus broad proximally, tapering gradually distally, palm bearing two rows of short spines along most of posterior margin (Table 2). Pereopods 3 to 7 ambulatory, spinose, lacking setae except for one or two superior proximal setae on the bases of pereopods 3 to 5. Pleopods 1 to 3 with subelliptical rami, exopods almost twice as long as endopods. Appendix masculina extending to pleotelsonic apex. Exopod of pleopod 4 with transverse suture near midpoint. Uropod with both rami narrow; endopod with apex narrowly rounded, extending almost to level of pleotelsonic apex; exopod reaching three-quarters along length of endopod, apex truncate, bearing slight indentation.

Colour in alcohol. Cream, lacking chromatophores.

Ovigerous female. Differs from male in its larger size, in the primary sexual characters and



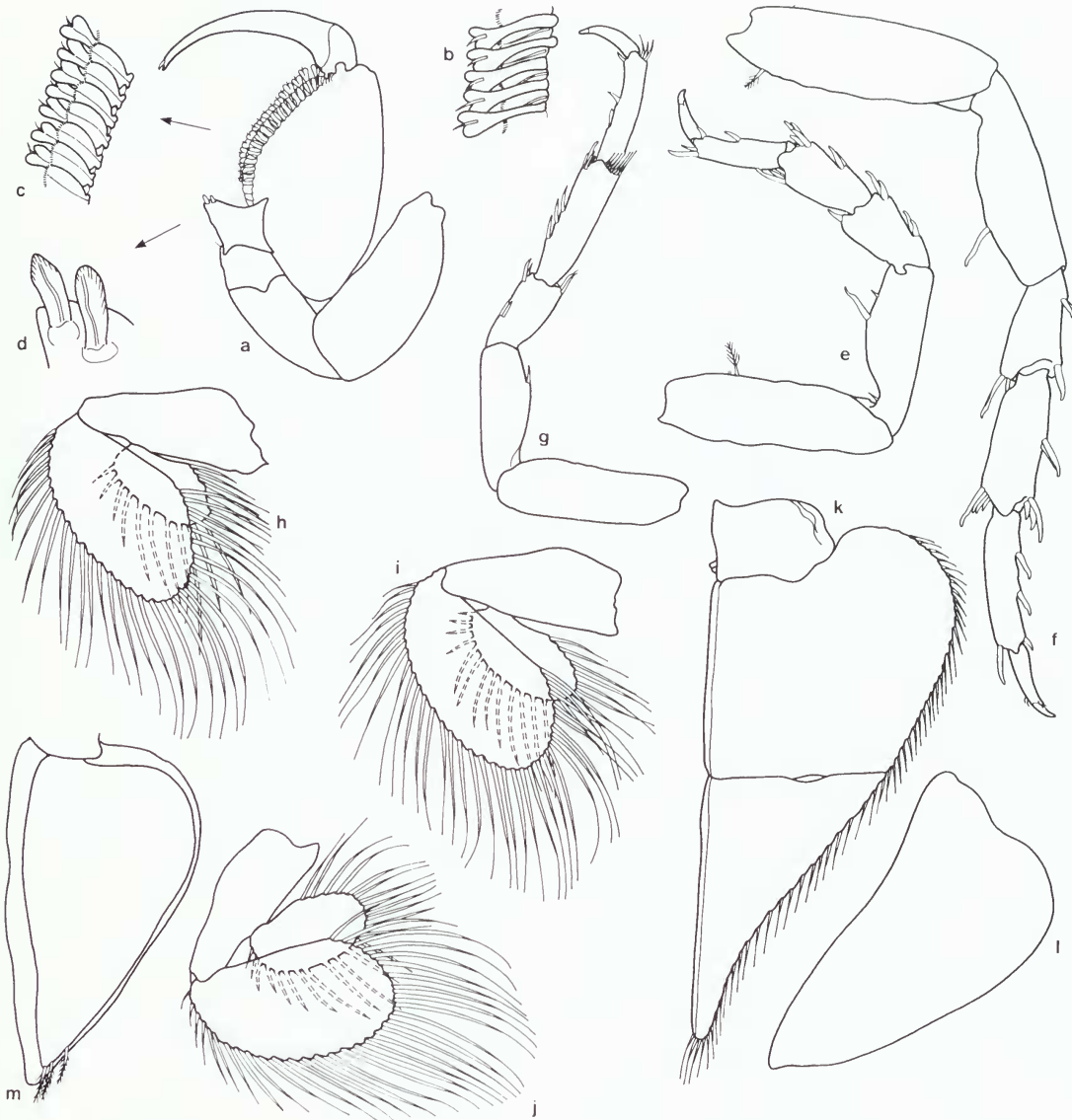


Figure 4. *Serolis levidorsata*, Port Phillip Heads. Ovigerous female (NMV J1493): a, b, dorsal and lateral views. c, pleon and pleotelson. Western Port, ovigerous female (NMV J1484): d, e, antennae 1, 2; f, epistome and labrum; g, left mandible; h, i, left and right mandibles; j, k, maxillae 1, 2; l, maxilliped; m, pleonal sternites; n, uropod. Adult male, Western Port (NMV J1483): o, pereopod 2; p, pereonal and pleonal sternites.

Figure 5. *Serolis levidorsata*, Western Port. Ovigerous female (NMV J1484): a, pereopod 1; b, c, mesial and lateral setae of pereopod 1 carpus; d, e, f, g, pereopods 2, 4 and 7; h-j, pleopods 1-3; k, l, exopod and endopod of pleopod 4; m, pleopod 5.

in having the antenna 1 flagellum shorter than the peduncle, of 17 articles.

Mouthparts. Left mandible with incisor teeth less pronounced than those of right mandible and anterior movable spine short, broad and blunt; right mandible with anterior movable spine long, slender and acute, with subapical notch. Both mandibles with posterior movable spines stout with acute weakly serrate apices. Mandibular palps well developed, articles 1 and 3 subequal, elongate, extending to incisor edge; article 3 half length of article 2; articles 2 and 3 bearing short inferior setae. Maxilla 1 inner lobe short, acute, with one subterminal spine; outer lobe curved, with 11 simple stout terminal spines. Maxilla 2 outer lobes each bearing two long simple setae; inner lobe with 12 terminal setae and a row of fine internal setae. Maxilliped divided into four plates; basis with two stout simple terminal spines and proximal marginal setae. Maxillipedal palp with article 1 short; article 2 curved, twice as long as broad, with internal margin setose; article 3 reniform, half length of article 2, terminally setose.

Etymology: Latin *levis* + *dorsum*, i.e. smooth + back.

Distribution: Vic. (type-locality: Western Port).

Remarks: In overall body shape and lack of dorsal ornamentation *Serolis levidorsata* resembles *S. convexa* Cunningham (from Argentina and the Falkland Islands), *S. gaudichaudii* Audouin & Milne-Edwards (from South America) and *S. laevis* Richardson (from the South Sandwich Islands), three closely related species. *Serolis levidorsata* differs however in having pereonite 6 fused with pleonite 1 in the dorsal midline (not entire as in the three other species); in the form of the posterior setae on the propodus of pereopod 1 (and in not showing sexual dimorphism for this character); in the form of the mandibular movable spines; in having maxillipedal palp article 2 curved, not cordate; and in lacking triangular extensions on the bases of pleopods 1 to 3.

The brood pouch of one ovigerous female paratype contained juveniles at two separate developmental stages (cf. Moreira, 1973, for

Serolis completa Moreira). Both stages were clearly of serolid form with six pairs of pereopods but four specimens had obviously calcified cuticles and measured approximately 4 mm in length, while the remaining 19 specimens were less developed, measuring approximately 2 mm in length with the cuticle soft and transparent. These two stages appear to correspond to marsupial stages D and E described for the sphaeromatid isopod *Dynamene bidentata* (Adams) (Holdich, 1968). In *D. bidentata* approximately 25% of all ovigerous females studied contained more than one developmental stage in the brood pouch, and mixed broods occurred especially with embryos at the D and E stages (Holdich, pers. comm.). However, the increase in length from stage D to E in *D. bidentata* was approximately 18% not 100% as noted for *S. levidorsata*. In *D. bidentata*, stage E juveniles leave the brood pouch and it is probable that the larger individuals in the pouch of *S. levidorsata* also represented the final marsupial stage.

Serolis longicaudata Beddard

Figure 6

Serolis longicaudata Beddard, 1884a: 330, 335-7.—1884b: 8, 31, 66, 72-84, 81, pls. 7, 8.—Whitelegge, 1901:2-4, 238.—Chilton, 1917: 393, 394, 397.—Hale, 1929: 307, 309.—Nordenstam, 1933: 16, 17, 39, 45, 47.—Sheppard, 1933: 256, 265, 268-71, 281, 353, 358.—Holdich & Harrison, 1980: 373.

Serolis (Heteroserolis) longicaudata: Nordenstam, 1933: 92, 93.

Material examined: 28 specimens (ovigerous female in Sep.):

SA, off Francis Is., Nuyts Archipelago, 11-24 m, Dr Verco, SAM C385(2). Spencer Gulf, 36 m, A. Zeitz, Feb. 1888, SAM C392(1).

Bass Strait, eastern Bass Strait, 71 m, 2 specimens from BSS stn 171 (NMV J2975). Off Port Phillip Heads, "Challenger" stn 161, BMNH (holotype).

NSW, off Twofold Bay (37°05'S, 150°05'E), sand and mud, 55-91 m, "Endeavour" collection, 30 Sep. 1914, ZMC (4 specimens). Off Jibbon Point, 84-99 m, "Thetis" collection, AM

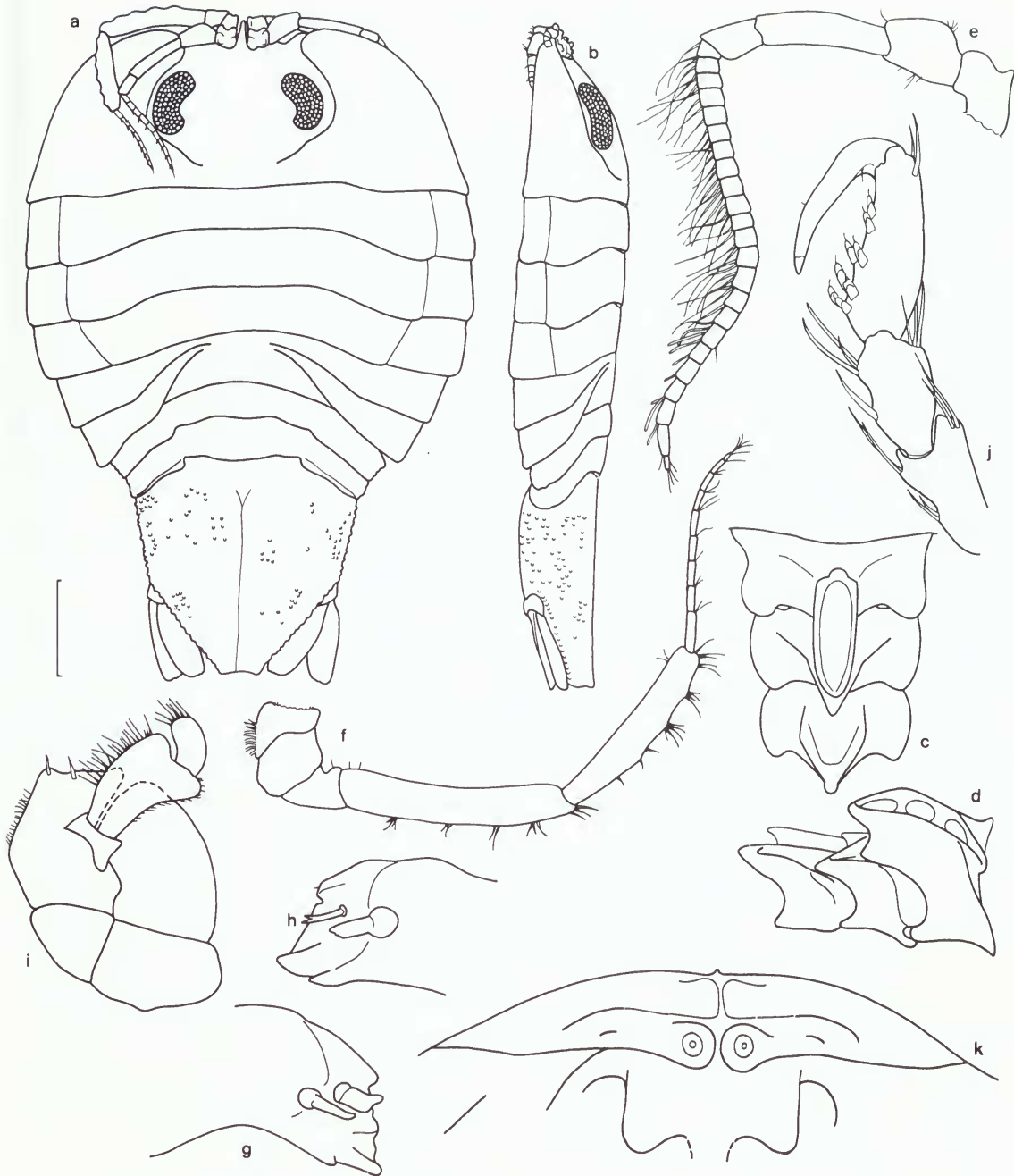


Figure 6. *Serolis longicaudata*, off Twofold Bay. Ovigerous female (ZMC): a, b, dorsal and lateral views; c, d, pleonal sternites. Adult male (ZMC): e, f, antennae 1, 2; g, h, left and right mandibles; i, maxilliped; j, pereopod 2; k, posterior pereonal sternites.

G2266(1). E. of Malabar, 66 m, 13 specimens from 3 AMSBS stations, AM P22774-9.

Description: Body outline pyriform, broad anteriorly; coxal plates of pereonites 2 to 6 subrectangular, truncate, closely applied, not freely projecting; those of pereonites 2 to 4 separated from tergites by sutures. Posterior coxal plates not extended. Head lacking tuberculation. Pereon and pleon smooth, lacking tuberculation. (In some specimens there may be a median keel with median tubercles distinct on the three pleonal tergites and, to a lesser extent, on the pereon (Chilton, 1917)). Pereonite 5 fused with pleonite 1 in dorsal midline. Lateral margins of pleonites 2 and 3 truncate, not extended. Pleotelson as long as broad, proximal half barely tapering, weakly granulose. Pleonal sternites with median extensions each bearing longitudinal grooves; extension of pleonite 1 not reaching apex of that of pleonite 2.

Antenna 1 extending to pereonite 2. Antenna 2 slender, peduncle not flattened, extending to pereonite 3. Uropod arising in posterior half of pleotelson; rami subequal, extending to level of pleotelsonic tip; apex of exopod broadly truncate; apex of endopod rounded.

Adult male. Propodus of pereopod 2 slender, tapering slightly from the proximal to the distal margin and bearing two rows of spines along most of the posterior margin (Table 2).

Distribution: SA, Bass Strait and southern NSW; shelf (type-locality: Bass Strait).

Remarks: In all specimens seen the posterior margin of pereonite 5 shows the same form but as variation occurs in other species it is possible that this character varies for *S. longicaudata*.

***Serolis pallida* Beddard**

Figure 7

Serolis pallida Beddard, 1884a: 330, 335, 336. — 1884b: 11, 15, 31, 66, 70, 74-7, 81, 84, pls. 7, 8. — Whitelegge, 1901: 204, 238. — Chilton, 1917: 394, 396. — Nordenstam, 1933: 13. — Sheppard, 1933: 256, 265, 268, 269, 282, 359. — Holdich & Harrison, 1980: 373.

Material examined: 18 specimens (ovigerous female in Sep.):

NSW, off Twofold Bay (37°05'S, 150°05'E),

"Endeavour" collection, 30 Sep. 1914: sand and mud, 55-91 m, ZMC (1 ovigerous female, 1 non-ovigerous female); 70-100 m, ZMC (2 adult males). Off Port Jackson, "Challenger" stn 163, BMNH (1 syntype). E. of Malabar, 66 m: AMSBS stn III, AM P24295(1). Off Cape Three Points, 74-90 m, "Thetis" collection, AM G2156(10). Port Jackson, AM G5375(1).

Bass Strait, eastern Bass Strait, 56-104 m, sandy-shelly sediment: 9 specimens from 5 BSS stations, NMV J2976-80. Off East Moncoeur Is., "Challenger" stn 162, BMNH (1 syntype).

Description: Body outline elongate, ovate. Coxal plates of pereonites 2 to 6 subrectangular, truncate, distally upturned, dorsally slightly concave. Coxal plates of pereonites 2 to 4 separated from tergites by sutures; posterior coxal plates not extended. Head with one pronounced, conical tubercle; eyes reniform, obvious. Pereonites 2 to 4 each bearing a slender acute median tubercle; lacking other obvious tuberculation. Pereonite 5 fused with pleonite 1 in dorsal midline. Pleonal tergites each with a median slender tubercle; lateral margins of pleonites 2 and 3 indented. Pleotelson as long as broad with slight lateral granulation and a low median protuberance either side of midline. Pleonal sternites with all three median extensions bearing longitudinal grooves; extension of pleonite 1 not reaching apex of that of pleonite 2.

Antenna 1 short, extending to posterior margin of pereonite 1; peduncle slender, 1.5 times length of flagellum. Antenna 2 with peduncle greatly flattened, subequal to length of entire antenna 1, with a short slender flagellum. Uropodal endopod not extending as far as pleotelsonic tip, tapering to a narrowly rounded apex; exopod two-thirds length of endopod, apex irregularly indented.

Adult male. Propodus of pereopod 2 broad proximally and tapering distally, its posterior margin bearing two rows of spines along most of its length (Table 2).

Distribution: Southern NSW and Bass Strait (type-locality: off Port Jackson and Bass Strait).

Remarks: In all specimens seen the posterior margin of pereonite 5 shows the same form but

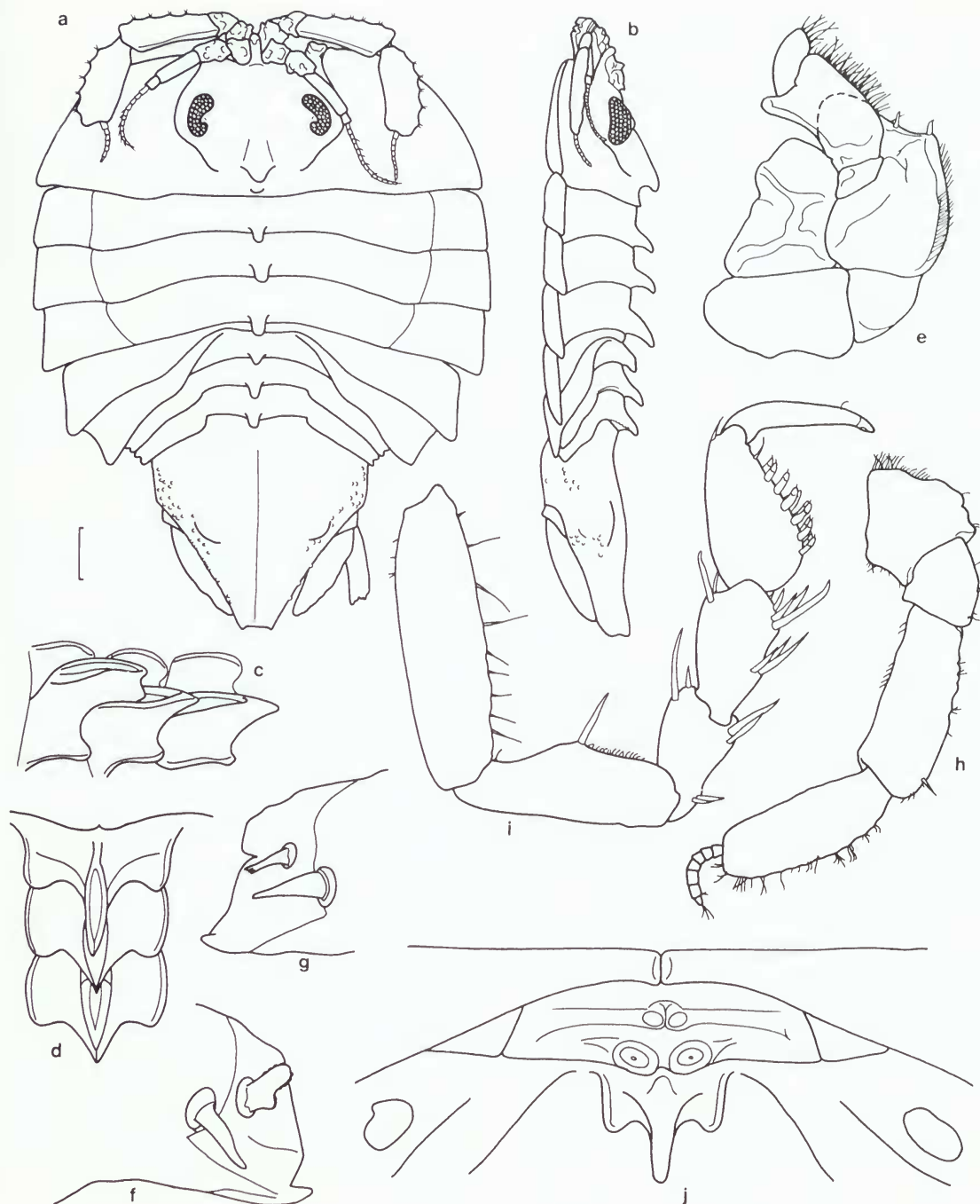


Figure 7. *Serolis pallida*, off Twofold Bay. Non-ovigerous female (ZMC): a, b, dorsal and lateral views; c, d, pleonal sternites; e, maxilliped. Ovigerous female (ZMC): f, g, left and right mandibles; h, antenna 2. Adult male (ZMC): i, pereopod 2; j, posterior pereonal sternites.

as variation occurs in other species, it is possible that this character varies for *Serolis pallida*. Also, in all specimens seen the lateral margins of pleonites 2 and 3 are indented. This indentation is not shown in Beddard's illustration of a type-specimen (1884b: pl. 7, fig. 1) and this character may be variable.

Some specimens from Bass Strait in the collection of the Museum of Victoria appear similar to *S. pallida* with which they co-occur. However, the peduncle of antenna 2 is not particularly flattened and the uropodal exopod is much shorter than in *S. pallida*. Until more material becomes available the identity of these specimens is undecided.

Serolis tuberculata Grube

Figure 8

Serolis tuberculata Grube, 1875: 209, 210, 227-30, 233, 234, pls. 5, 6. — Beddard, 1884a: 330, 334. — 1884b: 12, 14-16, 32, 48, 66-68, 81, pl. 6. — Chilton, 1917: 392-8. — Calman, 1920: 299, 300. — Hale, 1929: 307-9. — Nordenstam, 1933: 12, 39, 47-9. — Sheppard, 1933: 256, 265, 268, 269, 282, 358, 359. — Naylor, 1966: 184. — Poore et al., 1975: 33, 64. — Holdich & Harrison, 1980: 373. [not Whitelegge, 1901: 204, 236, 237. See *S. australiensis*]

Material examined: 134 specimens (ovigerous females in Jun. and Nov.):

SA, St Francis Is., Nuyts Archipelago, 11-24 m, Dr Verco, SAM C391(2); 20-30 m, D. Howlett, 29 Dec. 1979, SAM TC3622(1). Pearson Islands, S. A. Shepherd, SAM TC3614(2). Encounter Bay, H. Pulleine, 1889, SAM TC3615(2). W. of Semaphore, 11-13 m, H. M. Hale, SAM C393(1). Spencer Gulf, 18 m, K. Sheard, SAM TC3620(10). Gulf St Vincent, 7 m, SAM C390(2). Spencer Gulf and Gulf St Vincent, 1886 and 1888, SAM TC3616(7). Outer Harbour, H. M. Hale, SAM TC3621(1). Port River, NMV J1459(1). South Australian coast, SAM C388(1), C389(14).

Vic. Lorne, NMV J1458(1). Port Phillip Bay: 4-5 m, sandy sediments, 4 specimens from 3 PPBS stations (NMV J1455, J1456, J1500); off Altona, NMV J1499(1); off Beaumaris, NMV J1457(9). Western Port: 5-14 m, mud

and sand sediment, 6 specimens from 5 WBES stations (NMV J1448-52); 7 specimens from other localities (NMV J1453, J1497, J1498, J1501); "Endeavour" collection, 5 Nov. 1914, ZMC(2). Crib Point, 7-19 m, mud, sand and shell sediments, 57 specimens from 25 CPBS stations (NMV J1424-J1447, J1496).

Tas., Frederick Henry Bay, J.R. Penprase, 16 Aug. 1971, TM G1352(1). Great Taylor Bay, Bruny Is., D. Penprase, 25 Jul. 1971, TM G1796(10).

Bass Strait, off Western Port: from fish gut, 1975, NMV J1454(1). Off north-western Tasmania, 18-27 m: BSS stn 108, NMV J2991(2).

NSW, off Twofold Bay (37°05'S, 150°05'E), "Endeavour" collection, 30 Sep. 1914, 55-91 m, ZMC(2); 70-100 m, ZMC(20).

Description: Body outline broad, ovate. Coxal plates of pereonites 2 to 4 separated from tergites by sutures; coxal plates of pereonites 2 to 6 curved, apices acute; posterior coxal plates extended with tips freely projecting. Head with one posterior tubercle. Each pereonite bearing an acute median tubercle and a single transverse row of large irregular tubercles. In the dorsal midline, pereonite 5 may be either: fused completely with pleonite 1; marked posteriorly only by a shallow groove; or completely distinct from pleonite 1. Pleonal tergites each with a median carinate tubercle and a low transverse irregularity either side of the midline, pleonites 2 and 3 wider than pleotelson, margins rounded. Pleotelson broader than long with a median longitudinal carina and, either side of midline, a submarginal ridge and a median transverse ridge which meet as a pronounced tubercle; sometimes a second and third tubercle more posteriorly. Dorsal surface of body bearing short fine setae on the pleotelson, the coxal plates, and along the posterior margins of the tergites. Pleonal sternites with pronounced extensions, that of pleonite 1 extending to apex of that of pleonite 2 and not bearing a longitudinal groove.

Antenna 1 extending to pereonite 4. Antenna 2 slender, peduncle not flattened, extending to pereonite 3. Uropodal endopod extending to pleotelsonic tip, apex broadly rounded; exopod

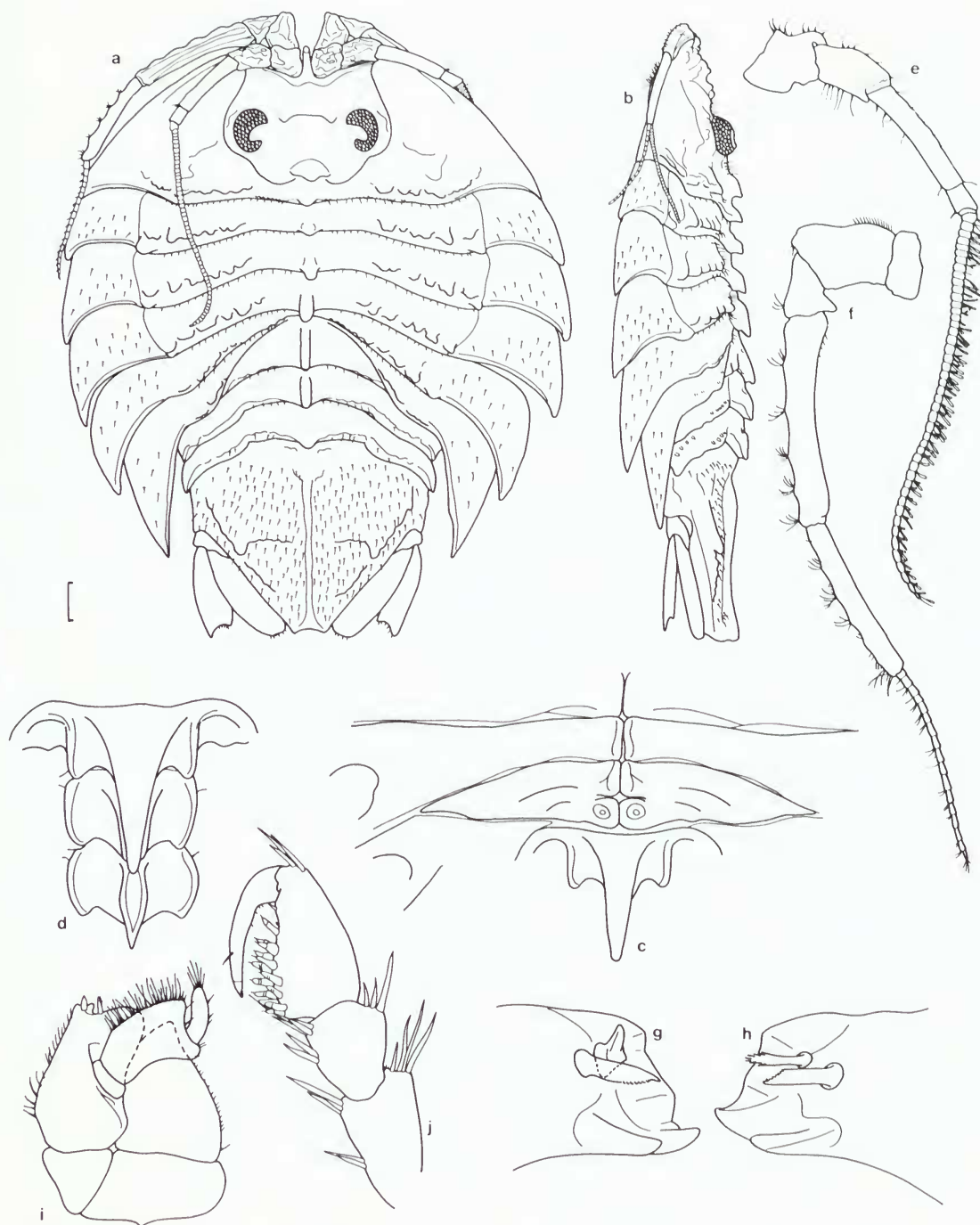


Figure 8. *Serolis tuberculata*, Western Port. Adult male (NMV J1445): a, b, dorsal and lateral views; c, posterior pereonal sternites; d, pleonal sternites; e, f, antennae 1, 2; g, h, left and right mandibles; i, maxilliped; j, pereopod 2.

two-thirds length of endopod, apex markedly emarginate.

Adult male. Propodus of pereopod 2 broad proximally and tapering distally with the posterior margin bearing two rows of short spines along most of its length (Table 2).

Distribution: SA, Vic., through Bass Strait to eastern Tas. and southern NSW; shelf and bays (type-locality: Bass Strait).

Remarks: The presence of dorsal setae is characteristic of this species, and, although individuals vary in the number of setae present, some setae have been found on all specimens examined. Variation also occurs between individuals in the prominence of the dorsal tuberculation and in the degree of coxal plate extension.

Serolis sp.

Figure 9

Material examined: Qld, Halifax Bay, Townsville (19°2.5'S, 146°31.5'E), soft mud on sandy mud, 11 m, P. Arnold, James Cook University, 23 Nov. 1976, QM W7969 (1 subadult male, 1 post-manca).

Description: Subadult male. Body outline elongate, ovate, coxal plates of pereonites 2 to 7 sub-rectangular, closely applied; those of pereonites 2 to 4 separated from tergites by sutures. Head with one low posterior tubercle. Dorsal surface of body lacking tuberculation but bearing a low median carina. In dorsal midline pereonite 5 fused with pleonite 1. Lateral margins of pleonites 2 and 3 not extended. Pleotelson broader than long with a low rounded protuberance either side of midline. Pleonal sternites with all three median extensions bearing longitudinal grooves, extension of pleonite 1 not reaching apex of that of pleonite 2.

Antenna 1 peduncle slender, short; flagellum 1.5 times length of peduncle, extending to level of pereonite 3. Antenna 2 peduncle twice length of antenna 1 peduncle, flattened, slightly expanded; flagellum short, reaching level of pereonite 3. Uropods arising in posterior half of pleotelson; endopod with apex obliquely truncate, not reaching level of pleotelsonic tip;

exopod three-quarters length of endopod, apex broadly truncate.

Distribution: North Qld; bays.

Remarks: These specimens appear to differ from the other species described here, but as they are immature it would be inadvisable to describe them as a new species (thereby fixing the type-material as immature specimens). They are included here for completeness and to allow inclusion in the key.

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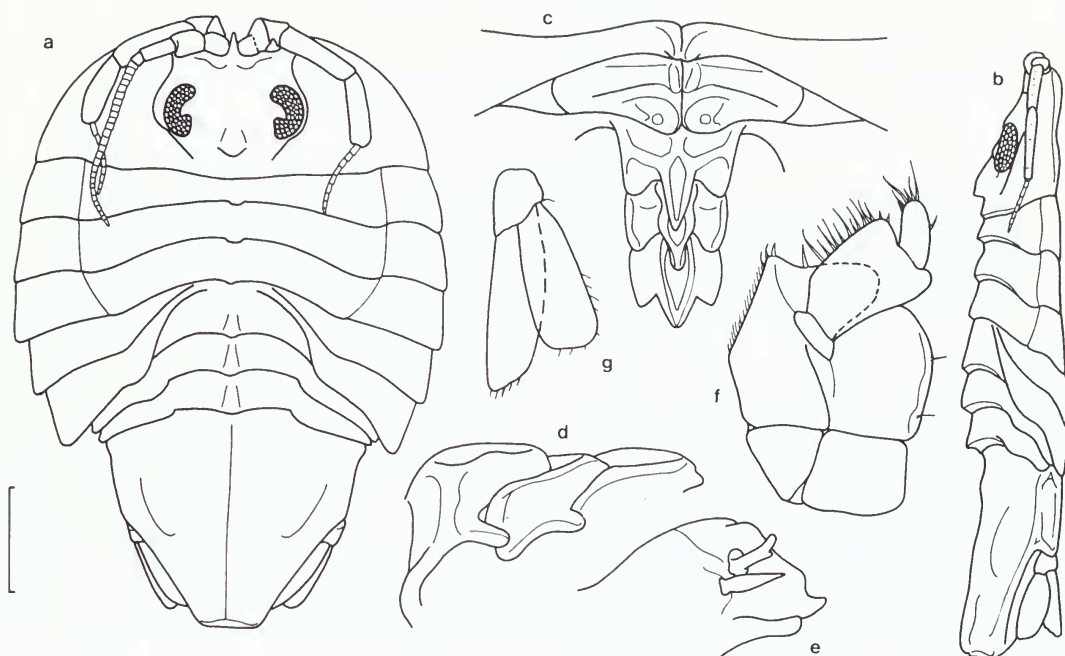


Figure 9. *Serolis* sp., Townsville. Subadult male (QM W7969): a, b, dorsal and lateral views; c, posterior pereopod and pleonal sternites; d, pleonal sternites; e, left mandible; f, maxilliped; g, uropod.

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Note

One of us (GCBP) currently has a paper in press with the *Journal of Crustacean Biology* describing a new serolid genus from Bass Strait. Its discovery requires that some amendments be made to the diagnosis of the Serolidae given here.